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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,177	01/14/2004	J. Scott Price	070191-0362 (112019)	4170
33679	7590	09/08/2004	EXAMINER	
GE MEDICAL SYSTEM C/O FOLEY & LARDNER 777 EAST WISCONSIN AVENUE MILWAUKEE, WI 53202-5367			SONG, HOON K	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/757,177	PRICE ET AL.	
	Examiner	Art Unit	
	Hoon Song	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-10 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. US 6760407 B2 in view of Zhou et al. (US 6553096B1).

Regarding claim 1, the patent claims a system comprising:

an X-ray source comprising:

a cold cathode, the cold cathode having a curved emission surface capable of emitting electrons; and

an anode spaced apart from the cathode, the anode being capable of emitting X-rays in response to being bombarded with electrons emitted from the curved emission surface, only a portion of the anode being bombarded at a time.

However the patent fails to claim wherein a relative position of the anode with respect to the curved emission surface changes during operation of the x-ray source.

Zhou teaches a rotary anode which changes of a relative position of an anode with respect to a cold cathode emission surface during operation of the x-ray source (figure 14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the x-ray system of the patent with the rotary anode as taught by Zhou, since the rotary anode of Zhou would prevent any over-heating or failure of the anode so that the life of the anode would be prolonged.

Regarding claim 2, Zhou teaches the anode is configured to rotate thereby changing the relative position of the anode with respect to the curved emission surface (figure 14).

Regarding claim 3, Zhou teaches the anode is configured to rotate about an axis and the axis does not extend through a center of the curved emission surface (figure 14).

Regarding claim 4, the patent teaches the electrons bombard the anode at a focal spot of the anode, and wherein a size and shape of the focal spot is determined at least in part by a curvature of the curved emission surface (claim 2).

Regarding claim 5, Zhou teaches the cold cathode comprises a plurality of emitters disposed on a substrate and a gate conductor disposed adjacent the plurality of emitters, and wherein the plurality of emitters are operative to emit electrons when a bias voltage is applied to the gate conductor (claim 30).

Regarding claim 6, Zhou teaches a vacuum housing and an X-ray transmissive window, wherein the cathode and the anode are disposed within the housing, and wherein the X-rays exit the X-ray source by way of the transmissive window (inherent).

Regarding claim 7, Zhou teaches the cold cathode is fabricated of a monolithic semiconductor.

Regarding claim 8, Zhou teaches the system is a medical imaging system.

Regarding claim 9, Zhou teaches the system is a security checkpoint imaging system.

Regarding claim 10, the patent teaches an x-ray detector adapted to detect x-rays from the passed through a subject of interest; and

a communication interface, the communication interface being coupled to the x-ray detector and configured to transmit image data of the subject of interest over a communication network (claim 28).

Claims 11-32 and 40-42 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. US 6760407 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims are anticipated by the claims of the patent as follows:

Regarding claim 11, the patent claims a system comprising:

an X-ray source comprising,

a cold cathode, the cold cathode having a curved emission surface capable of emitting electrons, the curved emission surface being curved in two dimensions; and

an anode spaced apart from the cathode, the anode being capable of emitting X-rays in response to being bombarded with electrons emitted from the curved emission surface.

Regarding claim 12, the patent claims the cathode comprising a plurality of emitters disposed on a substrate and a gate conductor disposed adjacent the plurality of emitter and a bias voltage applied to the gate conductor is less than 120 V.

Regarding 13, the patent fails to claim the bias voltage applied to the gate conductor is less than 50 V.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the gate voltage of the patent by less than 50 V, since the lower voltage would save electricity and prolong the life of the cathode.

Regarding claim 14, the patent claims the emission surface comprises a plurality of emitters each having an effective emitting area equal to or less than about 1×10^{-10} cm.

Regarding claim 15, the patent claims a vacuum housing and an X-ray transmissive window, wherein the cathode and the anode are disposed within the housing, and wherein the X-rays exit the X-ray source by way of the transmissive window.

Regarding claim 16, the patent claims the cold cathode is fabricated of a monolithic semiconductor.

Regarding claim 17, the patent claims the system is a medical imaging system

Regarding claim 18, the patent claims the system is a security checkpoint imaging system.

Regarding claim 19, the patent claims an x-ray detector adapted to detect x-rays from the anode after they have passed through a subject of interest; and

a communication interface, the communication interface being coupled to the x-ray detector and configured to transmit image data of the subject of interest over a communication network.

Regarding claim 20, the patent claims a diameter of the anode is larger than a diameter of the cathode.

Regarding claim 21, the patent claims teach a relative position of the anode with respect to the curved emission surface changes during operation of the x-ray source.

Regarding claim 22, the patent claims the anode is configured to rotate thereby changing the relative position of the anode with respect to the curved emission surface.

Regarding claim 23, the patent claims the emission surface of the cathode comprises a plurality of emitters comprising

a first set of emitters, the first set of emitters being operative to emit a first electron beam having a first focal spot with a first shape, and

a second set of emitters, the second set of emitters being operative to emit a second electron beam having a second focal spot with a second shape, the second shape being different than the first shape, and

wherein the first set of emitters and the second set of emitters are located on a same emission surface and are separately energizable.

Regarding claim 24, the patent claims the first set of emitters and the second set of emitters are located on a same curved emission surface.

Regarding claim 25, the patent claims the surface is curved in one of the two dimensions about an axis.

Regarding claim 26, the patent claims the surface is only curved in the one dimension about the axis.

Regarding claim 27, the patent claims the surface of the cathode being curved in two dimensions comprises being curved with a first radius in a first of the two dimensions and curved with a second radius, different than the first radius, in a second of the two dimensions.

Regarding claim 28, the patent claims a system comprising:
an X-ray source comprising,
a cold cathode, the cold cathode having an emission surface capable of emitting electrons and comprising a plurality of emitters,

the plurality of emitters comprising a first set of emitters, the first set of emitters being operative to emit a first electron beam having a first focal spot with a first shape, and a second set of emitters, the second set of emitters being operative to emit a second electron beam having a second focal spot with a second shape, the second shape being different than the first shape; and
an anode, the anode being spaced apart from the cathode, the anode being capable of emitting k-rays in response to being bombarded with electrons emitted from the curved emission surface;

wherein the first set of emitters and the second set of emitters are located on a same emission surface and are separately energizable (claim 1).

Regarding 29, the patent claims the cold cathode comprises a gate conductor disposed adjacent the plurality of emitters and wherein a bias voltage applied to the gate conductor is less than 120 V (claim 7).

Regarding 30, the patent fails to claim the bias voltage applied to the gate conductor is less than 50 V.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the gate voltage of the patent by less than 50 V, since the lower voltage would save electricity and prolong the life of the cathode.

Regarding claim 31, the patent claims effective emitting area equal to or less than about 1×10^{-10} cm (claim 6).

Regarding claim 32, the patent claims the first set of emitters and the second set of emitters are located on a same curved emission surface (claim 1).

Regarding claim 40, the patent claims an imaging system for imaging a subject of interest, comprising:

an X-ray source, the X-ray source including a cold cathode disposed within a housing, the cold cathode having a curved emission surface, the cold cathode comprising a plurality of emitters disposed on a substrate, and an anode, the anode being disposed within the housing and spaced apart from the cathode, the anode emitting X-rays in response to being bombarded with electrons emitted from the curved emission surface',

a detector configured to receive the X-rays emitted by the x-ray source and generate signals in response thereto; and

an X-ray controller, the X-ray controller being coupled to the cold cathode to provide control signals to control the emission of electrons from the plurality of emitters, the X-ray controller being configured to receive feedback information pertaining to the operation of the imaging system, and to adjust the control signals for the plurality of emitters as a function of the feedback information (claim 12).

Regarding claim 41, the patent claims an x-ray detector adapted to detect x-rays from the anode after they have passed through a subject of interest; and a communication interface, the communication interface being coupled to the x-ray detector and configured to transmit image data of the subject of interest over a communication network (claim 21).

Regarding claim 42, the patent claims an x-ray system comprising:

an X-ray source, the X-ray source including a cold cathode disposed within a housing, the cold cathode having a curved emission surface, the cold cathode comprising a plurality of emitters disposed on a substrate, and

an anode, the anode being disposed within the housing and spaced apart from the cathode; the anode emitting X-rays in response to being bombarded, at a focal spot, with electrons emitted from the curved emission surface; and

an X-ray controller, the X-ray controller being coupled to the cold cathode to provide control signals to control the emission of electrons from the plurality of emitters

the X-ray controller configured to adjust the control signals for the plurality of emitters so as to cause the focal spot to wobble (claim 26).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11, 33 and 35-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Norman (US 4012656).

Regarding claim 11, Norman teaches a system comprising:

an X-ray source comprising,

a cold cathode (12), the cold cathode having a curved emission surface capable of emitting electrons, the curved emission surface being curved in two dimensions (figure 3); and

an anode (34) spaced apart from the cathode, the anode being capable of emitting X-rays in response to being bombarded with electrons emitted from the curved emission surface (figure 3).

Regarding claim 33, Norman teaches an X-Ray system, comprising:

an X-ray source comprising

a cold cathode (13), the cold cathode having a curved emission surface capable of emitting electrons; and

an anode (34), the anode being spaced apart from the cathode, the anode being capable of emitting X-rays in response to being bombarded, on a surface of the anode, with electrons emitted from the curved emission surface;

wherein the curved emission surface of the cathode has a different shape than the surface of the anode bombarded with electrons (cylindrical vs. conical shape).

Regarding claims 35-36, Norman fails to teach an x-ray detector configured to detect x-rays emitted from the x-ray source.

It would have been obvious to one of ordinary skill in the art at the time of the invention to adapt the x-ray of Norman with an x-ray detector, since the x-ray detector would visualize the emitted x-ray for user convince.

Regarding claim 37, Norman teaches the curved emission surface is curved in two dimensions (figure 3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12-22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norman in view of Zhou et al. (US 6553096B1).

Regarding claim 12, Norman fails to teach the cathode comprising a plurality of emitters disposed on a substrate and a gate conductor disposed adjacent the plurality of emitter and a bias voltage applied to the gate conductor is less than 120 V.

Zhou teach the cathode structure (figure 7, column 9 line 45).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the x-ray source of Zhou with the cathode structure as taught by Zhou, since the cathode of Zhou would improve the emittability of the x-ray source.

Regarding claim 13, Zhou teach the bias voltage applied to the gate conductor is less than about 50 V (column 9 line 45).

Regarding claim 14, Zhou teach the emission surface comprises a plurality of emitters each having an effective emitting area equal to or less than about 1×10^{-10} cm (Nanotubes).

Regarding claim 15, Zhou teach a vacuum housing and an X-ray transmissive window, wherein the cathode and the anode are disposed within the housing, and wherein the X-rays exit the X-ray source by way of the transmissive window (figure 9).

Regarding claim 16, Zhou teach the cold cathode is fabricated of a monolithic semiconductor (nanotubes).

Regarding claim 17, Zhou teach the system is a medical imaging system (column 4 line 25-53).

Regarding claim 18, Zhou teach the system is a security checkpoint imaging system (column 4 line 25-53).

Regarding claim 20, Zhou teach a diameter of the anode is larger than a diameter of the cathode (figure 21).

Regarding claim 21, Zhou teach a relative position of the anode with respect to the curved emission surface changes during operation of the x-ray source (figure 21).

Regarding claim 22, Zhou teach the anode is configured to rotate thereby changing the relative position of the anode with respect to the curved emission surface (figure 21).

Regarding claim 25, Norman teaches the surface is curved in one of the two dimensions about an axis.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is (571) 272-2494. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (571) 272 - 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DAVID V. BRUCE
PRIMARY EXAMINER

HKS

3/17/04
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